CLAIMS

1. A process for preparing silicon-bridged metallocene compounds of formula (I):

$$(Cp)(SiR^1_2)(Cp)ML_q \qquad (I)$$

wherein (SiR^1_2) is a divalent group bridging the two Cp rings, the R^1 groups, equal to or different from each other, are hydrogen atoms, or linear or branched, saturated or unsaturated C_1-C_{20} alkyl, C_3-C_{20} cycloalkyl, C_6-C_{20} aryl, C_7-C_{20} alkylaryl or C_7-C_{20} arylalkyl groups, two R^1 can optionally join to form a 3-7 membered ring;

Cp, equal to or different from each other, is a substituted or unsubstituted cyclopentadienyl group, optionally condensed to one or more substituted or unsubstituted, saturated, unsaturated or aromatic rings, containing from 4 to 6 carbon atoms, optionally containing one or more heteroatoms;

M is a transition metal belonging to group 3, 4, 5, 6 or to the lanthanide or actinide groups of the Periodic Table of the Elements (IUPAC version);

the substituents L, equal to or different from each other, are monoanionic sigma ligands selected from the group consisting of linear or branched, saturated or unsaturated C_1-C_{20} alkyl, C_3-C_{20} cycloalkyl, C_6-C_{20} aryl, C_7-C_{20} alkylaryl and C_7-C_{20} arylalkyl groups, optionally containing one or more Si or Ge atoms;

q is an integer ranging from 0 to 2, being equal to the oxidation state of the metal M minus 2;

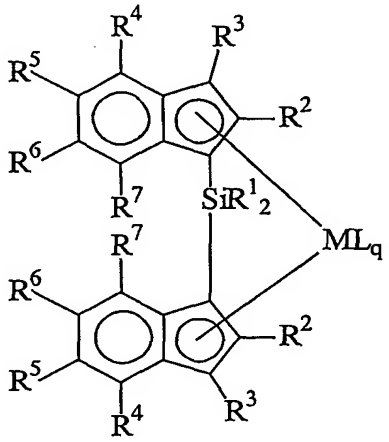
said process comprises the following steps:

a) reacting, at a temperature of between –10°C and 70°C, a ligand of formula (Y-Cp)(SiR^1_2)(Cp-Y) with about 2 molar equivalents of an alkylating agent of formula TH_w, L_jB or LMgL', wherein Cp, R^1, and L have the meaning reported above; T is lithium, sodium or potassium, H is an hydrogen atom, w is 0 or 1, when w is 0 the compound TH_w is metallic lithium, sodium or potassium, when w is 1 the compound of formula TH_w is an hydride of lithium, sodium or potassium; L' is an halogen atom selected from chlorine, bromine and iodine; B is an alkali or alkali-earth metal; and j is 1 or 2, j being equal to 1 when B is an alkali metal, and j being equal to 2 when B is an alkali-earth metal; the groups Y, the same or different from each other, are suitable leaving groups;

b) after the reaction has been completed, adding at least q molar equivalents of an alkylating agent of formula L_jB or LMgL'; and

c) reacting, at a temperature of between −10°C and 70°C, the product obtained from step b) with at least 1 molar equivalent of a compound of formula ML'_s, wherein M have the meaning reported above; s is an integer corresponding to the oxidation state of the metal and ranges from 3 to 6; and L' is an halogen atom selected from chlorine, bromine and iodine.

2. The process according to claim 1, for preparing a silicon-bridged metallocene compound of formula (II):



(II)

wherein:

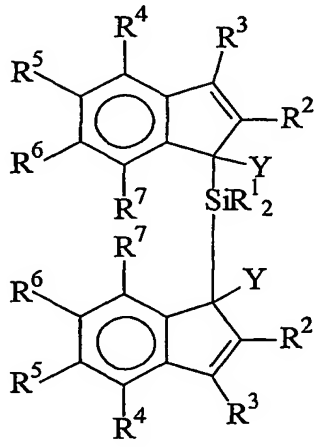
M, L, q and R^1 have the meaning reported in claim 1;

R^2, equal to or different from each other, are hydrogen atoms or linear or branched, saturated or unsaturated C_1-C_{20}-alkyl, C_3-C_{20}-cycloalkyl, C_6-C_{20}-aryl, C_7-C_{20}-alkylaryl or C_7-C_{20}-arylalkyl radicals, optionally containing heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements;

R^3, R^4, R^5, R^6 and R^7, equal to or different from each other, are hydrogen atoms or linear or branched, saturated or unsaturated C_1-C_{20}-alkyl, C_3-C_{20}-cycloalkyl, C_6-C_{20}-aryl, C_7-C_{20}-alkylaryl or C_7-C_{20}-arylalkyl radicals, optionally containing heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements; two vicinal R^3, R^4, R^5, R^6 and R^7 can also form one or more condensed 5 or 6 membered saturated or unsaturated rings optionally containing heteroatoms belonging to groups 13-16 of the Periodic Table of the Elements, said rings can bear alkyl substituents;

said process comprises the following steps:

a) reacting, at a temperature of between –10°C and 70°C, a ligand of formula (III)



(III)

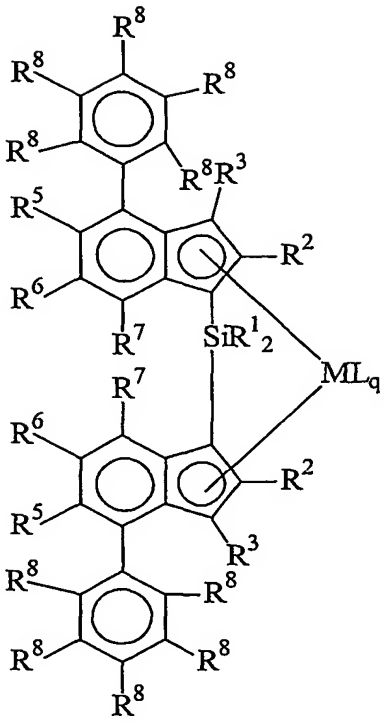
or one of its double bond isomers;

wherein R^1, R^2, R^3, R^4, R^5, R^6 and R^7 have the meaning described above; with about 2 molar equivalents of an alkylating agent of formula TH_w, L_jB or LMgL', wherein L has the meaning reported above; T is lithium, sodium or potassium, H is an hydrogen atom, w is 0 or 1, when w is 0 the compound TH_w is metallic lithium, sodium or potassium, when w is 1 the compound of formula TH_w is an hydride of lithium, sodium or potassium, L' is an halogen atom selected from chlorine, bromine and iodine; B is an alkali or alkali-earth metal; and **j** is 1 or 2, **j** being equal to 1 when B is an alkali metal, and **j** being equal to 2 when B is an alkali-earth metal; the groups Y, the same or different are suitable leaving groups;

b) after the reaction has been completed, adding at least q molar equivalents, of a compound of formula L_jB or LMgL'; and

c) reacting, at a temperature of between –10°C and 70°C, the product obtained from step b) with at least 1 molar equivalent of a compound of formula ML'_s, wherein M have the meaning reported above; s is an integer corresponding to the oxidation state of the metal and ranges from 3 to 6; and L' is an halogen atom selected from chlorine, bromine and iodine.

3. The process according to claims 1 or 2, for preparing a silicon-bridged metallocene compound of formula (IV):



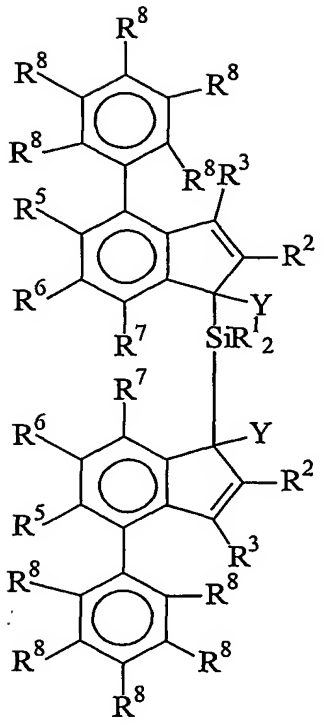
(IV)

wherein:

M, L, q, R^1, R^2, R^3, R^5, R^6 and R^7 have the meaning described in claims 1 or 2; and R^8 is a hydrogen atom, or a linear or branched, saturated or unsaturated C_1-C_{20}-alkyl, C_3-C_{20}-cycloalkyl, C_6-C_{20}-aryl, C_7-C_{20}-alkylaryl or C_7-C_{20}-arylalkyl radical, optionally containing heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements;

said process comprises the following steps;

a) reacting, at a temperature of between –10°C and 70°C, a ligand of formula (V)



(V)

or one of its double bond isomers;

wherein R^1, R^2, R^3, R^4, R^5, R^6, R^7 and R^8 have the meaning described above;

with about 2 molar equivalents of an alkylating agent of formula TH_w, L_jB or LMgL', wherein L has the meaning reported above; T is lithium, sodium or potassium, H is an hydrogen atom, w is 0 or 1, when w is 0 the compound TH_w is metallic lithium, sodium or potassium, when w is 1 the compound of formula TH_w is an hydride of lithium, sodium or potassium, L' is an halogen atom selected from chlorine, bromine and iodine; B is an alkali or alkali-earth metal; and j is 1 or 2, j being equal to 1 when B is an alkali metal, and j being equal to 2 when B is an alkali-earth metal; the groups Y, the same or different from each other, are suitable leaving groups;

b) after the reaction has been completed, adding at least q molar equivalents of a compound of formula L_jB or LMgL'; and

c) reacting, at a temperature of between –10°C and 70°C, the product obtained from step b) with at least 1 molar equivalent of a compound of formula ML'_s, wherein M have the meaning reported above; s is an integer corresponding to the

oxidation state of the metal and ranges from 3 to 6; and L' is an halogen atom selected from chlorine, bromine and iodine.

4. The process according to anyone of claims 1 to 3 wherein step b) is carried out in a time ranging from 1 minute to 6 hours after step a).
5. The process according to anyone of claims 1 to 4 wherein Y is a hydrogen atom or a $-SiR_3$ or $-SnR_3$ group, wherein the groups R are linear or branched saturated or unsaturated C_1-C_{20}-alkyl, C_3-C_{20}-cycloalkyl, C_6-C_{20}-aryl, C_7-C_{20}-alkylaryl or C_7-C_{20}-arylalkyl radicals.
6. The process according to anyone of claims 1 to 5 wherein the metal M is Ti, Zr or Hf.
7. The process according to anyone of claims 1 to 6 wherein the compounds ML_s are $ZrCl_4$, $ZrBr_4$, ZrF_4, $HfCl_4$, $HfBr_4$, HfF_4, $TiCl_4$, $TiBr_4$ and TiF_4;
8. The process according to anyone of claims 1 to 7 wherein in step b) 1+q molar equivalents of a compound of formula L_jB or LMgL' wherein L, L' and B have the meaning as described in claim 1 is added.
9. The process according to anyone of claims 1 to 8 wherein step a) and b) are carried out at a temperature ranging from -5°C and +55°C.
10. The process according to anyone of claims 1 to 9 wherein step c) is carried out at a temperature ranging from 0°C and 60°C.